

## **IN-SITU-ETCH-ASSISTED HDP DEPOSITION USING $\text{SiF}_4$ AND HYDROGEN**

### **ABSTRACT OF THE DISCLOSURE**

A process is provided for depositing an undoped silicon oxide film on a substrate disposed in a process chamber. A process gas that includes  $\text{SiF}_4$ ,  $\text{H}_2$ , a silicon source, and an oxidizing gas reactant is flowed into the process chamber. A plasma having an ion density of at least  $10^{11}$  ions/cm<sup>3</sup> is formed from the process gas. The undoped silicon oxide film is deposited over the substrate with the plasma using a process that has simultaneous deposition and sputtering components. A temperature of the substrate during such depositing is greater than 450 °C.

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